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HOSPITAL BUILDING NOTE

WARD UNITS

4

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AND SOCIAL SECURITY

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(Revised 1968)

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Building Notes recommend the standards of accommodation and services for hospital departments which the Department of Health and Social Security considers it reasonable to provide. Each Building Note contains a Cost Note from which may be derived a Departmental Cost Allowance appropriate to the department. Hospital Boards are at liberty to depart from the design recommendations given in Building Notes provided that they are satisfied that the standards of accommodation and services they adopt are adequate. The Departmental Cost Allowance, however, is to be regarded as the maximum sum of money available for the department and it should not be exceeded. Hospital Boards are encouraged to produce designs for the provision of appropriate accommodation and services at a cost less than the Departmental Cost Allowance.

An addendum to Appendix E of Hospital Building Note No. 2, *The Cost of Hospital Buildings*, which sets out cost recommendations for Ward Units, is supplied with this Building Note.

Foreword

This Building Note describes the room provision and design features for a 30-bed nursing unit. Other types of ward, including larger wards and geriatric wards, are under consideration and a Supplement to this Note may be issued later.

The Department of Health and Social Security is in the process of designing a series of standard hospital departments, one of the first of which to be completed will be the standard ward. The dossier describing this plan, including all the production material necessary for its construction (sketch and working drawings, assemblies, engineering details, bills of quantities, etc.) will be issued in 1968.

In designing the standard ward, the recommendations of the Building Note have been applied in the way considered the most efficient and economical, both from the point of view of staffing and operating the ward unit and of its construction.

I. Scope

1. The Note deals with all ward units in a district general hospital other than the following:

(*a*) Maternity wards (Hospital Building Note No. 21)

(*b*) Children's wards (Hospital Building Note No. 23)

(*c*) Psychiatric wards (Hospital Building Notes Nos. 30, 31 and 32)

(*d*) Intensive therapy units (Hospital Building Note not yet published)

(*e*) Isolation wards (Hospital Building Note not yet published)

(*f*) Barrier nursing units

(*g*) Geriatric wards

(*h*) Deep-plan ward units

Radiotherapy wards should follow the general lines of this Note, but reference should be made to the forthcoming Hospital Building Note on Radiotherapy Department, at present in draft. If it is likely that a ward will have to accommodate patients undergoing treatment with radium or other forms of radioactive material (not teletherapy) the provisions of the *Code of Practice for the Protection of Persons Against Ionising Radiations arising from Medical and Dental Use* must be observed.

II. General considerations

Aims

2. All in-patient accommodation considered here should be grouped together and the aims in planning should be:

(*a*) to relate in-patient accommodation properly to diagnostic and treatment facilities;

(*b*) to ensure an efficient pattern of communications, supplies and services;

(*c*) to make economical use of staff, equipment and services.

3. It is of paramount importance that the plan provides within the ward proper conditions for medical and nursing care, with enough flexibility to meet changing medical and nursing needs when they occur; patient needs, however, must not be compromised.

Medical needs

4. (i) Sufficient space to examine and treat patients in privacy both in the immediate bed area and in separate treatment rooms.

(ii) Facilities for isolating patients whose condition demands it.

(iii) Arrangements which discourage the outbreak of infection and limit its spread. (See paragraphs 9–13 below).

(iv) Ability to find nursing staff within the ward.

(v) Ease of access to patients' notes and reports, space to write these and privacy to discuss them. Ability to teach without disturbing either staff or patients.

(vi) Ease of access to individual patients and short walking distances between groups of patients.

Nursing needs

5. (i) Easy supervision and access to patients with direct observation from the nurses' station of patients in Group A (see paragraph 8).

(ii) Sufficient space in single rooms and behind bed curtains in multi-bed rooms to attend a patient in privacy with the bed partially stripped and a dressings trolley in position, and to accommodate orthopaedic extensions where required.

(iii) Facilities for locating and summoning other staff quickly in an emergency.

(iv) Short walking distances between groups of bedfast patients and the main ancillary rooms, and a limitation of the number of patients who are out of sight and hearing from the ancillary rooms.

(v) Space in a sufficient number of w.c's., washing cubicles or bathrooms to attend a chair patient and, in assisted or treatment bathrooms, to attend a bed patient also.

(vi) Sufficient storage near the point of use.

(vii) Arrangements which secure as far as possible that nurses are employed entirely on nursing duties and that these are mainly undertaken within the ward area.

Patient needs

6. (i) The facility of seeing and speaking to nurses as they move to and fro.

(ii) Privacy during periods of medical and nursing care.

(iii) Washing facilities and w.c. close at hand and affording privacy.

(iv) Space to sit up within the bed area.

(v) Space for personal belongings within easy reach of the bed.

(vi) Space at the bedside for visitors.

(vii) A change of environment, e.g. in day/dining spaces for those who can benefit from it.

Pattern of patient care

7. A decision on the pattern of patient care must be stated in the early stages of procedure as this will affect the:

(*a*) size of the ward floor (see paragraphs 18–21 below);

(*b*) nursing management, e.g. housekeeping, administration;

(*c*) catering services, e.g. degree of centralisation of dining facilities;

(*d*) supply system, e.g. delivery and storage of linen, etc.;

(*e*) disposal system, e.g. handling of soiled and infected linen.

The vital decision is the extent to which progressive patient care is to be implemented and whether dependency groups are to be organised within each ward unit or on a hospital or floor basis.

Progressive patient care

8. The emergence of progressive patient care is a major factor in recent ward planning developments. By this is meant the systematic grouping of patients according to the degree of illness and dependence on the nurse rather than by classification of disease or sex. Five main classes of care are identified: intensive therapy; intermediate care; self-care; continuation, long-term or rehabilitation care; and care at home after discharge. The first three of these affect ward design.

Intensive therapy

The Department recommends the provision of an intensive therapy unit serving the whole hospital for 1 per cent to 2 per cent of the total acute beds. This will be used for patients in a critical stage of illness, requiring constant medical and nursing care. Most of them will require complicated equipment. Intensive therapy units are not discussed in this Building Note as a separate Note is being issued.

Intermediate care

About three-quarters of patients in acute general wards fall into the intermediate care category which may be sub-divided into two groups:

Group A: Those patients who are seriously ill and therefore require a considerable amount of basic and technical nursing and may need such treatments as oxygen, suction, intravenous fluids, drainage or traction. These patients require an environment conducive to rest. They must be under observation and they may get reassurance if they are able to see nurses going about their work. Although very ill, some may be able to go with assistance to a w.c. Some may sit out of bed for short periods. According to a recent Departmental study, about a quarter of all patients fall into this group.

Group B: Patients in this group require full bedside care and supervision but are able to help themselves to some extent and a higher proportion of them will wash, bath and use a w.c. Many of these patients will sit out of bed. The Departmental study shows that about half of all patients are in this group.

Self care

Group C: These patients are up for at least 4 hours each day; are ambulatory; able to feed, wash and go to the w.c. by themselves. Those under the age of 12 years or over 75 years are not included in this category.

The problem of infection

9. Patients are generally susceptible to infection. The risk to them is increased by peculiarities of the hospital environment and is augmented by certain forms of treatment. It is reduced by good medical and nursing practice, by keeping up a high standard of environmental cleanliness, by limiting the amount of contact that patients have with one another, and by ventilating in ways that will dilute concentrations of organisms and limit the chance of their circulating from one area to another.

10. Certain kinds of infections are so liable to spread that as soon as their presence is suspected segregation in infectious disease accommodation is the only safe course; there are also some forms of treatment that so reduce natural defence mechanisms that those under-

going the treatment must be nursed in rigid isolation. These categories are not catered for in accommodation described in this Building Note.

11. Of the remaining patients, some are themselves obvious sources of infection that may spread to others. Some of these ought to be nursed in single rooms in isolation. Some because of their condition are especially susceptible to infection and will be safer if nursed in relative seclusion, sometimes in a single room.

12. The classification and distribution of patients with these considerations in mind will reduce the danger from infection; wards should be designed to facilitate segregation when this is needed, and ventilated to avoid dissemination of infection and to encourage its dilution.

13. No architectural or engineering ingenuity can replace cleanliness and proper ward technique in controlling infection. It is much easier, however, for the staff to carry out their duties safely if due thought is given to the finish of walls and floors, the design of furnishings and the type of partitions, screens and curtains.

III. Planning considerations

Communications

14. There should be easy communications with diagnostic departments and treatment areas for both patients and staff, and with service departments for staff and materials.

Orientation, prospect and external noise

15. Sunlight falling within a building gives brightness, warmth, enhancement of colour and modelling, all of which tend to produce a more pleasant environment. Sunlight should not be a primary factor in ward orientation but is desirable if other major planning considerations are first satisfied. It is most desirable in bed spaces and day spaces. Other ward areas which should be considered are waiting areas and relatives' rooms.

16. Potential disadvantages of sunlight are excessive heat gain and discomfort caused by glare. Both are closely related to the size of window which should be as small as compatible with satisfactory daylighting standards: in wards a daylight factor of 1 per cent at 3 feet above floor level on the centre-line of the innermost bed should be aimed at; where this is not achieved, supplementary artificial lighting (British Standard Code of Practice 150) may be necessary. Reducing the window area will also reduce heat loss. Other controls of heat gain include external blinds or louvres, which tend to be expensive, and heat-absorbing glass as the outside skin of a ventilated cavity—although in currently available forms this type of glass can alter the apparent skin colour and therefore makes difficult the assessment of small changes. Glare control is particularly important in bed areas since many patients are restricted to one place and even to one posture. Means of glare control include curtains, light-absorbing glazing, blinds or louvres, internal or external, and careful design of window frames. Low morning and evening sun angles should be given particular attention because of their greater penetration and because they fall within the normal angle of vision.

17. Prospect, although as important to the patient as admitted sunlight, is usually pre-determined. Where a choice exists the emphasis should be on giving patients a view of human activity, but this must be balanced against the need to exclude external noise from bed areas. Overlooking of other areas requiring privacy must be avoided.

Where external noise is serious it can be properly controlled only by special windows or sealed windows with air conditioning. These measures would be justified only in special situations such as on some restricted city sites or near airports.

Need for flexibility and size of multi-ward floor

18. The more specialised and inflexible the ward unit becomes the more difficult it is to make full use of it. It should therefore be designed so that it can, without major structural changes, be altered in respect of medical speciality, size of nursing unit and degree of nursing care.

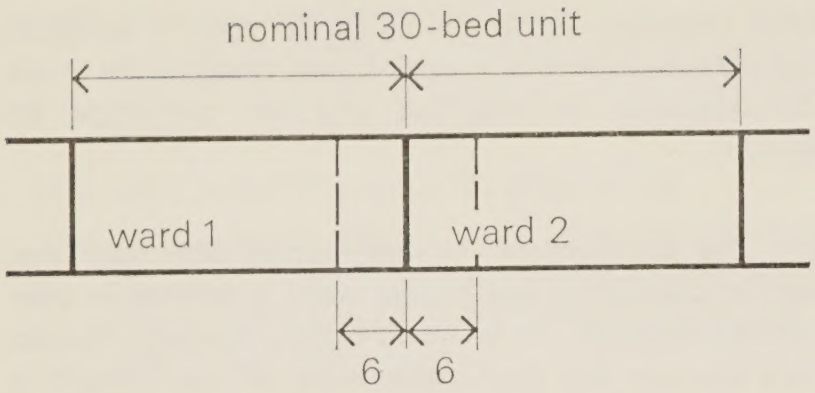
19. If one lesson is clear from recent developments in the organisational patterns of wards, it is that there is unlikely to be any answer which will for long satisfy constantly changing conditions and standards. Patterns of medical need, systems of patient care, methods of reducing infection and many other factors relating to ward planning are bound to change. It is essential that hospital buildings, within the limits of economy and ingenuity, be capable of accommodating these changes. This need cannot be met by the provision of separate ward units which can only be operated independently and which cannot fluctuate in size.

20. A large floor of beds zoned for progressive patient care has the advantage of offering great flexibility in the use of beds. Examples of floor plans of 60, 72, 75, 90, 120 and 240 beds have been submitted to the Department. This Note deals with a 30-bed ward as a costing unit, but this is not intended to imply that multiples of 30 beds are the only acceptable answer.

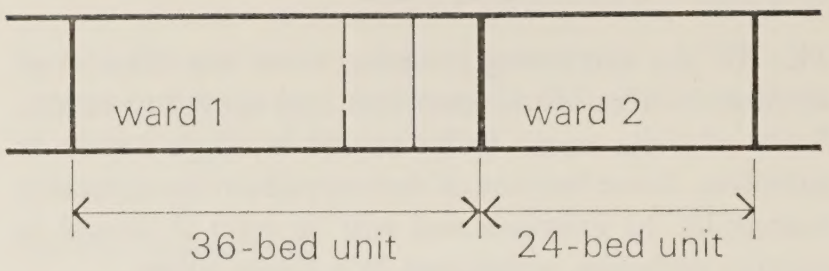
21. It is, however, essential that the distribution of ancillary rooms is such that a large floor of beds can be broken down into fully functioning individual units.

Interchange beds

22. The floor needs to be planned so that the nominal size of a ward unit, say 30 beds, can be varied by release

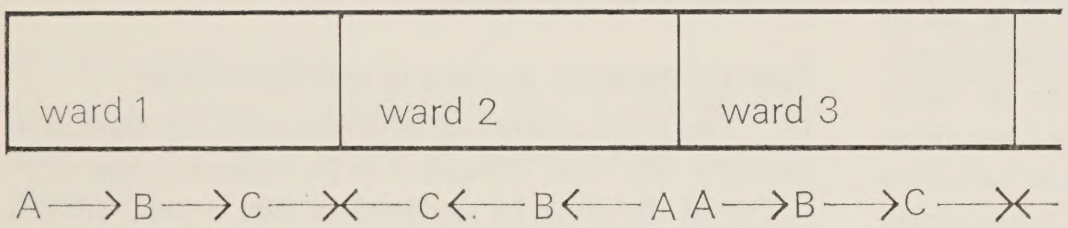


a. Two nominal 30-bed adjacent ward units with 12 interchange beds

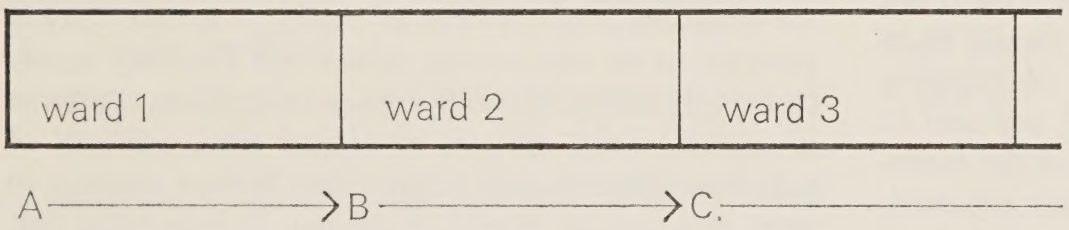


b. Two ward units with maximum interchange

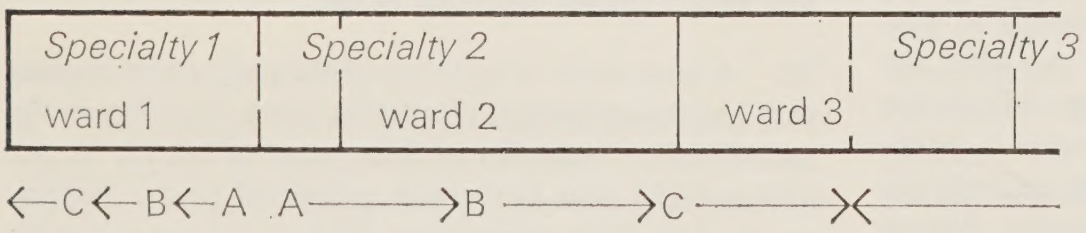
Figure 1 Interchange beds



a. Cycle within each ward unit



b. Cycle for ward floor



c. Cycle within each specialty

Figure 2 Possible groupings of patients according to nursing dependency (Progressive Patient Care)

NB: Normal cycle of progress: Admission→A→B→C→Discharge

or acquisition of beds along the boundary with an adjacent ward. One way of achieving this is by peripheral banding of beds, that is, by planning the majority of beds in a continuous band along the periphery of the building.

23. By these means, firstly the size of the ward unit can be altered to meet seasonal and other fluctuations and changing medical needs; and secondly the floor can be administered either as a series of independent ward units or as one unit with few physical divisions.

24. With continuous peripheral banding of the majority of beds, those adjacent to the nominal boundary between the two ward units can be regarded as interchange beds to be used by either unit as the need arises. In the case of 30-bed ward units, as shown in Figure 1, it is expected that the maximum likely variation would be plus or minus 6 beds and a total of 12 would be considered as interchange beds.

Ward access and day spaces

25. Access to ward units involves the important principle that no ward unit should form the passageway into another.

(N.B. None of the diagrams is intended to suggest a particular size of ward, size of ward floor or arrangement of wards on a ward floor).

26. Where more than one entrance is provided to a ward unit, the main entrance must be easily identifiable.

27. Figure 2 illustrates, diagrammatically, a variety of possible arrangements of patient dependency groups on a ward floor.

28. Whatever the arrangement of dependency groups, *Group A* patients (i.e. acutely ill) should be nursed near the entrance to a unit for the convenience of house officers, night sisters and other staff.

29. Any day spaces serving a ward unit (as opposed to local day spaces in the multi-bed rooms) would be most useful to *Group C* (self-care) patients and there is some advantage in terms of flexibility of use if day spaces can be shared by adjacent wards.

Internal noise and privacy. (See Hospital Design Note No. 4—Noise Control.)

30. Some internal noise, e.g. from doors, trolleys, footsteps, can be reduced or eliminated at source by attention to details such as choice of appropriate footware, resilient materials and nylon bearings or regular lubrication. Earphones should be considered for television sets in day spaces (see also paragraph 156). Noise which cannot be eliminated at source, e.g. talking, emptying bed-pans, movement of lift doors, can be reduced by planning for them to occur within enclosures separated from bed areas, interconnecting doors being self-closing where possible and detailed to reduce sound transmission.

31. Following is a list of areas between which sound reduction measures should be considered in the interest of quiet or privacy:

sister's office (conversations)—waiting area/clerk/corridor
nurse base telephone (conversations)—bed areas
doctor's office (conversations)—corridor/waiting area
treatment room (patient in distress)—corridor
single room (noisy patient)—bed areas/corridor
television day room (television loudspeaker)—bed areas
utility room (clatter and conversation at night)—bed areas
ward clerk (conversation)—waiting area
toilets (w.c. cistern, water splashing, etc.)—bed areas.

IV. Room relationships and room provision

Derivation of provision

32. The number and size of the rooms provided, their relationship to each other, their planning and equipment, are derived from the needs of doctors, patients and nurses described in paragraphs 4, 5 and 6.

Notes on scheduled areas and room heights

33. Areas given in the following schedule of accommodation are generally regarded as minimum standards of provision. Larger areas may be needed in some planning situations; on the other hand it may sometimes be possible to meet the requirements satisfactorily by providing smaller areas (see also paragraph 38).

34. The room provision described in paragraph 37 relates to a 30-bed ward unit, which is likely to be the most usual size, except where it is noted as being shared by more than one unit. Normally, however, it will form part of a larger integrated number of beds on a floor. It should not be assumed, however, that the ward floor will consist of nursing units which are all of the same size. It should be capable of functioning differently from this if the distribution of medical specialties or the pattern of patient care so requires without seriously straining the room relationships described, although in these circumstances some rooms normally related to a single nursing unit may have to be shared.

35. The dimensions from which areas have been derived are discussed in the Room Data Sheets under " Dimensions ".

36. Areas and dimensions given are to wall faces and relate to the use of components based on dimensional increments of four inches. A height of 9 feet from floor to ceiling is recommended for bed areas although this could be reduced in other areas.

37. Schedule of accommodation for a 30-bed nursing unit

Note: Areas given in the following schedule are regarded as minimum standards of provision. Larger areas may be required in some planning situations. Areas refer to provision for 30-bed nursing unit except where otherwise indicated, and unless otherwise indicated should be varied proportionately when the number of beds served is varied.

	Accommodation	*Basic/ additional*	*Number of units*	*Area per unit*
(*a*)	*Wards*	B		
	(i) Single rooms		20 per cent of adult acute beds in the hospital (i.e. average of 6 for every 30 adult acute beds) with a minimum of 4 in any one 30-bed unit	124 and 136 sq. ft. Half number of single rooms in one unit to be of each size.
	(ii) Multi-bed areas ..		Remainder of beds	87 sq. ft. per bed exclusive of area required for lavatory basin, grouped clothes lockers, etc., for which another 7 sq. ft. per bed would be required.
(*b*)	*Day spaces*	B	—	18 sq. ft. per bed (to include day spaces shared between wards).
(*c*)	*Patients' sanitary facilities* ..	B	Suggested alternatives	

	I	II	III	IV	
(i) Bathroom, large ..	1+l.b.	1+l.b.	1+l.b.	1+l.b.	115 sq. ft.
(ii) Bathroom, small ..	2+l.b's	1	2	1+l.b.	45 sq. ft.
(iii) Showers	2	2	1	2 for general use 1 to each of half single rooms	28 sq. ft.
(iv) Washing cubicles ..	2	4	4	—	18 sq. ft.
(v) W.c's.	4 for general use in 2 pairs one in each pair with l.b. and large enough to admit wheelchair			4 for general use each with l.b., in 2 pairs one in each pair large enough to admit wheelchair	W.c. only 13 sq. ft. W.c. + l.b. 21 sq. ft. W.c. + l.b., with or without bidet, for wheelchair patients 32 sq. ft.
	4 to single rooms, each large enough to admit wheelchair. (An additional w.c. may be required adjacent to day space, large bathroom or urine test area if not close to general w.c's.)				

(*d*)	*Staff base*	B	1	107 sq. ft.
(*e*)	*Clean supplies*	B	1	200 sq. ft.
	(i) Clean utility			110 sq. ft. } If separate
	(ii) linen storage			50 sq. ft. } If separate
	(iii) General storage ..			40 sq. ft. } If separate
(*f*)	*Treatment room*	B	1	150 sq. ft.
(*g*)	*Dirty utility/sluice/test room* ..		1	186 sq. ft.
(*h*)	*Cleaning*			
	(i) Cleaners' room ..	B	1	50 sq. ft.
	(ii) Ward furniture cleaning room	A	1 *per floor up to 120 beds*	288 sq. ft.
(*i*)	*Flower bay or area*	B	1	30 sq. ft.
(*j*)	*Catering*	B		
	(i) Pantry: conventional service by ward staff		1	140 sq. ft. } Alternatives
	(ii) Pantry: conventional service by catering staff		1 *per 60 beds*	220 sq. ft. } Alternatives
	(iii) Pantry: centralised tray service		1	60 sq. ft. } Alternatives
	(iv) Finishing kitchen ..		1 *per 120 beds*	600 sq. ft.
	(v) Beverage point ..		1	12 sq. ft. required with (ii) and (iv)
(*k*)	*Sister's office*	B	1	105 sq. ft.
(*l*)	*Doctor's office*	B	1	105 sq. ft.
(*m*)	*Seminar and demonstration room*	A	1 *per 60–90 beds*	170 sq. ft.

	Accommodation	Basic/ additional	Number of units	Area per unit
(*n*)	*Nursing, lay and domestic administrators' office(s)*	A	1 or more *per floor*	105 sq. ft.
(*o*)	*Staff cloaks*	B	1 *per floor*	85 sq. ft. *per 30 beds*
(*p*)	*Patients' relatives' room* ..	B	1 *per 60 beds*	115 sq. ft.
(*q*)	*Visitors' waiting area* ..	B	1 or *1 per floor*	200 sq. ft. *per 30 beds*
(*r*)	*Wheelchair park*	B	1	40 sq. ft.
(*s*)	*Switchgear room*	B	1 *per 60 beds*	40 sq. ft. *per 60 beds*

CIRCULATION (C)
Circulation space necessary for the above.

COMMUNICATIONS (D)
Plant room—300 sq. ft. gross per 60 beds.

l.b. = lavatory basin.

V. Room planning data

38. Some of the following information derives from user requirement studies where these exist.

As recommended areas have no real validity except when related to particular room shapes, the clear room dimensions from which the areas were derived are given under the heading " Dimensions ". These room shapes are those used in the appropriate user requirement studies where these exist. They permit the particular activities that have to be accommodated but assume that access points, windows, etc., are positioned to enable the room to be used to the best advantage.

(*a*) *Wards*

(*a*) (i) *Single-bed rooms*

Functions and activities

(1) To accommodate patients who are:
- (i) liable to infect others;
- (ii) particularly susceptible to infection;
- (iii) seriously ill (*Group A*);
- (iv) requiring special clinical attention, quiet surroundings or privacy;
- (v) likely to disturb others;
- (vi) in pay beds.

(2) For administration of total care to bedfast patients.

(3) To provide accommodation for patients who are out of bed to sit, eat and wash.

(4) If there is no central isolation unit at least two rooms must be capable of being used as isolation rooms by provision of air-locks and of adjoining w.c's. The air-lock must not interfere with observation of the upper half of the patient. Space for gowning is also needed in each air-lock.

Location

To accommodate patients requiring much medical and nursing care it is advisable to have at least two of the larger rooms next to each other and so placed to facilitate observation of the patient's head from the vicinity of the staff base. There are advantages in having single rooms grouped to allow flexibility of use.

Dimensions

The smaller rooms should measure 10 ft. 8 in. clear along the axis of the bed, the larger rooms 11 ft. 8 in. to admit extra equipment and/or orthopaedic attachments. For air-locks dimensions of 5 ft. 8 in. × 5 ft. 8 in. are adequate.

Serviced equipment affecting layout

Large medical basin. Wash-hand basin in each air-lock.

(*a*) (ii) *Multi-bed areas*

Function and activities

(1) To accommodate patients in *Group A* who will require a w.c. close at hand and a small sitting area within the bed space.

(2) To accommodate patients in *Group B* who will need w.c. and washing facilities within a reasonable distance from the bed and preferably a sitting area within the bed space.

(3) To accommodate *Group C* patients who will be likely to use their bed areas primarily for sleeping and medical examination.

(4) To accommodate bed groups which are large enough to provide a variety of company but small enough for companionship, i.e. between 4 and 8 beds. In most cases 6 beds is felt to be the optimum number to satisfy this requirement and to achieve compactness in the overall ward layout.

Location

Group A patients should be placed for direct observation of the patient's head and arms from the vicinity of the staff base. This implies that corridor walls above the height of 3 ft. should be glazed.

Dimensions

The recommended clear width of a multi-bed room is 21 ft. 8 in. The area of 87 sq. ft. per bed is derived from a bed space width of 8 ft. and a dimension to the centre of the bed-room of 10 ft. 10 in.

Serviced equipment affecting layout

Large medical basin.

(b) *Day spaces*

(See User Requirement Study No. 8A.)

Function and activities

(1) To allow patients a change of environment.

(2) To encourage early ambulation.

(3) To provide for reading, writing, talking.

(4) To provide facilities for listening to the radio and watching television.

(5) To provide for exercise supervised by a physiotherapist, and for occupational therapy.

(6) To provide facilities for eating meals.

Location

This will vary according to operational policies; one or more of the following alternatives could be adopted:

(1) Within multi-bed areas. *Group A* and a small proportion of *Group B* patients will be assisted out of bed for short periods of time.

(2) Sited to serve the ward unit: nearest to *Group C* patients (to maintain compactness of bed areas and reduce walking distances).

(3) Sited so as to be shared by two ward units.

(4) Sited so as to be shared by a floor of up to 120 beds in which case it will probably be used principally as a dining area, and some day space will be required within the ward unit.

Where open bays are used as day spaces, some form of screening should be provided but this should not interfere with easy supervision by staff.

There should be easy access to w.c's., particularly in geriatric assessment wards.

Activities which interfere with each other, e.g. reading and listening to the radio, should be provided with separate areas where possible. There is advantage, therefore, in patients having available a choice of day spaces, possibly by sharing between adjacent ward units. Those day spaces intended for noisy activities should be sited so as not to disturb patients in bed spaces and designed as rooms with self-closing doors rather than open bays.

Dimensions

Unless it serves a whole floor, the dimensions should be equivalent to those of a single room, 4 or 6 bed.

(c) *Patients' sanitary facilities*

Location

The following points should be borne in mind when siting these facilities:

(1) The order of patient priority for proximity of these facilities follows the patient dependency grouping, i.e. *A*, *B*, *C*.

(2) Economies can be achieved in service and drainage provisions by grouping sanitary facilities.

(3) Flexible use of the ward unit should be considered e.g. for male and female patients together.

One solution would be the provision of two groups of facilities, the first related to *Group A* and part *Group B* and the second to the remainder of *Group B* and *Group C*. Each could include small bathroom with basin, shower, washing cubicle, w.c., wheelchair w.c. with basin (alternative I in the Schedule of Accommodation) with the large bathroom placed centrally. Alternatively, the first could contain shower, w.c. and basin, wheelchair w.c. and basin; the second the large bathroom, small bathroom, shower, w.c. and basin, wheelchair w.c. and basin (alternative IV). In this way the necessary facilities would be provided near the appropriate patient groups, the two halves of the ward unit could be used for male and female patients respectively, and economy of services could be achieved by concentration. This, however, is only one solution intended to demonstrate the principles involved.

W.c's. attached to single rooms should be sited so as not to obscure a view from the corridor of the head and arms of a patient in bed.

A w.c. is required close to the day room, large bathroom, and urine test area. An additional w.c. may have to be provided in order to satisfy all these requirements.

(c) (i) *Large bathroom*

Function and activities

(1) The bathing of patients with assistance involving lifting of the patient from bed, trolley or wheelchair into the bath, manually or with the aid of a hoist.

(2) The administering of a treatment bath involving a dressing before or after bathing.

(3) Washing, shaving, hair washing for patient in a wheelchair at lavatory basin.

Dimensions

Recommended area of 115 sq. ft. allows the patient to be brought in on a bed and implies dimensions of 8 ft. 8 in. × 12 ft. 8 in. or 9 ft. 8 in. × 11 ft. 8 in. In view of changing medical requirements, these dimensions should be provided even if sitz or hip baths are installed. These dimensions also allow access from both sides of the bath and wheelchair access round the end of the bath.

Serviced equipment affecting layout

Bath maximum 5 ft. 4 in. × 2 ft. 6 in.: the base of bath should be 10 in. off the ground to allow the use of a patient hoist. Toe space should be provided on all accessible sides of the bath.

Lavatory basin.

(*c*) (ii) *Small bathroom*

Function and activities

(1) Bathing of ambulant and semi-ambulant patients, drying and dressing. It is recommended that facilities should be provided for entry into the bath from a sitting position and space for a platform should be provided level with the rim of the bath at the end distal from the taps.

(2) Washing, shaving, washing hair at the lavatory basin.

Dimensions

Recommended area of 45 sq. ft. implies clear dimensions of 7 ft. 8 in. × 5 ft. 8 in. which should be provided whatever type of bath is used.

Serviced equipment affecting layout

Bath maximum 5 ft. 6 in. × 2 ft. 6 in.
Lavatory basin.

(*c*) (iii) *Showers*

Functions and activities

(1) For use by ambulant and semi-ambulant patients. There should be space for those who have to sit while washing and to admit patients who have to be pushed into the shower cubicle itself on a wheelchair.

(2) Drying and dressing of patients in an area curtained off from the shower itself.

Dimensions

Recommended area of 28 sq. ft. implies clear dimensions of 5 ft. 8 in. × 4 ft. 8 in. or 7 ft. 8 in. × 3 ft. 8 in.

Serviced equipment affecting layout

Shower.

(*c*) (iv) *Washing cubicles*

Function and activities

(1) For ambulant patients to wash and shave in privacy.

(2) For patients in wheelchairs to wash and shave, sometimes with assistance.

Dimensions

The area of 18 sq. ft. implies clear dimensions of 3 ft. 8 in. × 4 ft. 8 in., with outward opening or sliding doors.

Serviced equipment affecting layout

Lavatory basin.

(*c*) (v) *W.c.*

Function and activities

Used by—

(1) ambulant patients.

(2) semi-ambulant patients: assisted without sani-chair, unassisted or assisted with sani-chair.

Activities—

(1) Use of w.c.

(2) Washing hands either in w.c. compartment or immediately adjacent.

(3) Use of bidet—which should be encouraged by provision in at least one wheelchair w.c.

Dimensions

(N.B. Outward opening or sliding doors should be provided to all w.c's. and these dimensions assume as much.)

(1) W.c. only for ambulant patients:
area of 13 sq. ft. implies clear dimensions of 4 ft. 8 in. × 2 ft. 8 in.

(2) W.c. and lavatory basin for ambulant patients:
area of 21 sq. ft. implies clear dimensions of 5 ft. 8 in. × 3 ft. 8 in.

(3) W.c. and lavatory basin with or without bidet, for wheelchair patients:
area of 32 sq. ft. implies clear dimensions of 5 ft. 8 in. × 5 ft. 8 in.

Serviced equipment affecting layout

W.c. suite.
Lavatory basin.
Bidet.

(*d*) *Staff base*

(See User Requirement Study No. 7.)

Function and activity

(1) Nursing, administrative and clerical control point for the ward unit.

(2) Storage point for patients' records.

(3) Issuing and receiving point for all written and much verbal information concerning nursing and medical care of the patient.

(4) Enquiry point.

(5) May be the co-ordination point for a ward communications system.

(6) May include the medicine storage area if the clean utility is not closely associated.

(7) May include a beverage point.

(8) The base will be in use night and day.

(9) One base can serve up to about 30 beds. A nursing unit of as many as 40 beds would require two bases.

Location

Sited to give maximum visual control of the main patient activity zones, particularly those bed areas holding the most critically ill patients. If the ward is L-shaped, the inherent disadvantage of this shape in terms of observation must be alleviated by placing the staff base at the junction. A view of the ward entrance is essential. Patients' bedrooms should preferably not be sited directly behind the base because of disturbances to patients.

Dimensions

If storage cupboards are placed behind the desk, clear space between cupboards and desk should be 4 ft. minimum. The area of 107 sq. ft., implying dimensions of 15 ft. 8 in. × 6 ft. 10 in., does not include medicine area or beverage point.

Serviced equipment affecting layout

Medicine sink (if medicine area included).
Beverage equipment (if beverage point included).

(*e*) *Clean supplies*

The information under this heading describes the supplies areas in their traditional components—clean utility, linen storage and general storage—but it should be remembered that there are numerous degrees of centralisation which can be adopted within the ward unit. For example, a Department of Health and Social Security development project is planned with one central supplies area which also fulfils the function of a clean utility room serving the treatment room; local linen trolleys are topped up periodically from this supplies area.

The items which have to be considered in the evolution of a supplies system include the following, their storage points in the context of this Building Note being indicated in brackets:

(i) linen (linen store);
(ii) sterile supplies (clean utility);
(iii) crockery and hardware (pantry);
(iv) stationery (staff base, offices);
(v) pharmaceuticals (staff base or clean utility);
(vi) cleaning materials (cleaners' room);
(vii) disposable items: bedpan liners, vomit bowls, sacks (dirty utility);
(viii) provisions (pantry);
(ix) patients' clothing (bed area or general store);
(x) patients' suitcases (general store or centrally);
(xi) equipment for use on wards: bed cradles, hoists (general stores or centrally).

The supply system to be adopted for each of these items must be considered as an integral part of the whole hospital supply system; the choice will probably be between topping up, exchange trolley and requisition systems. The amount of storage space required at ward level will depend largely on the supply system adopted with regard to such items as linen and sterile supplies, and on the degree of floor centralisation for storage of such items as patients' suitcases. Where available, rough figures for calculating the volume of storage space required at ward level for a particular item are given in the following data sheets.

(*e*) (i) *Clean utility*

(See User Requirement Study No. 3.)

Function and activities

(1) Reception and storage of sterile packs, syringes and needles, sterile disposable items, clean items such as bandages, sterile topical fluids, external lotions and disinfectants.
(2) Holding and preparing all clean and sterile materials used in the treatment of patients.
(3) Assembly of items for patient treatment either on worktop adjacent to hatch to treatment room, or on trolley.
(4) Occasional heating of lotions.
(5) Washing hands.
(6) Reception, storage, preparation and recording of drugs either here or at the staff base.

Location

Directly associated with the staff base. Preferably adjoining the treatment room by means of a hatch.

Dimensions

The area of 110 sq. ft. is derived from clear dimensions of 9 ft. 8 in. × 11 ft. 8 in. and assumes the inclusion of a medicine storage area.

Serviced equipment affecting layout

Large medical basin.

(*e*) (ii) *Linen storage*

Function and activities

(1) Reception and holding stocks of linen which will probably not exceed the requirements for 24 hours, or 72 at the most if stocks to cover holiday breaks are held here.
(2) Distribution of linen to points of use, by hand or on trolley.

Location

The main linen storage needs to be near or adjacent to the staff base. It should be sited so that delivery of linen will cause the minimum of disturbance in the patient areas; in some situations a pass-through arrangement into the linen room from outside the ward may be possible. A subsidiary trolley base or shelving will also be required.

Dimensions

The most important factor is the volume of shelving or cupboard space available. The requirements vary for wards of different specialities, but the wards under consideration are intended to be interchangeable in function and, if topping up or trolley exchange systems are employed, 1 to 1½ cubic feet per patient per day should be provided. Linen to cover holiday breaks can be stored here or elsewhere in the supply line. If here, then storage volume should be trebled. The area given in the schedule of accommodation would cover the 72-hour requirement at 4 cubic feet per patient in an area 6 ft. 8 in. × 7 ft. 8 in. Space should be allowed for handling trolleys within the storage area.

(*e*) (iii) *General storage*

Function and activities

(1) Receiving and holding the following stocks:
miscellaneous hardware;
disposable items other than those stored in clean and dirty utility rooms.
(2) Possibly holding the following items if their storage is not centralised:
patients' suitcases;
equipment such as drip stands, cot sides and cradles.
(3) Possibly holding patients' clothing although storage close to the patient is to be preferred.

Location

If these items are stored separately from those in the linen store and clean utility, there are advantages in storing in a corridor cupboard.

Dimensions

As the storage volume required for these items will depend on the policy adopted with regard to each of the

items listed above, no quantitative guidance is given. The floor area shown in the schedule is an average figure for use only during initial planning.

(*f*) *Treatment room*

(See User Requirement Study No. 4.)

Function and activities

(1) Carrying out sterile procedures with sterile equipment, e.g. lumbar puncture or surgical dressing.

(2) Carrying out clinically clean procedures, e.g. stomach wash-out.

Three classes of procedures may be identified:

(1) examination and diagnosis;

(2) emergency treatments;

(3) routine treatments and dressings.

Patients may be ambulant or on wheelchair, trolley or bed.

Location

Preferably linked, by means of a hatch only, to the clean utility and disposal area. While this direct link is not essential to its efficient functioning, it is essential that the treatment room be planned in as central a position as possible, with convenient access, so as to encourage its use. In order of preference for proximity to the treatment room, the patient dependency groups would be *B*, *A* and *C*.

Dimensions

The area of 150 sq. ft. implies clear dimensions of 11 ft. × 8 in. × 12 ft. 8 in. In this room particularly, the area given is closely related to the dimensions—if these dimensions cannot be provided an increase in area and careful detailed planning will probably be required.

Serviced equipment affecting layout

Large medical basin.

(*g*) *Dirty utility/sluice/test room*

(See User Requirement Study No. 2.)

Function and activities

(1) Collection of dirty, foul and infected linen and holding of mobile stands.

(2) Clearing trays or trolleys used in treatments. Holding sacks containing dirty dressings, general waste, glass and small linen items. Holding return containers and drainage bottles for central sterile supply department.

(3) Disposing of liquids.

(4) Rinsing drainage bottles and some C.S.S.D. items.

(5) (*a*) *Traditional bed-pans and bottles:* storage of clean bed-pans and bottles. Washing of used bed-pans and bottles. Holding bed-pans for inspection and for Pathology. Storing clean vomit bowls. Emptying, rinsing and drying used bowls.

(*b*) *Disposable bed-pans and bottles:* storage of bed-pan liners, holders, bottles and bowls. Disposing of liners, bottles and bowls. Cleaning of holders. Holding specimens for inspection and for Pathology.

(6) Holding and testing urine specimens.

(7) Washing hands.

(8) Possibly cleaning patients' wash bowls.

Location

It is essential for this room to be nearest to the *Group A* patients. It should also be adjacent to the treatment room (or near to the clean utility if the three rooms are not *en suite*) if this can be achieved without compromising the first requirement.

Dimensions

The area of 186 sq. ft. implies a clear width of 14 ft. 8 in. and depth of 12 ft. 8 in.

Serviced equipment affecting layout

Slop hopper.
Sinks, two, each with drainer.
Lavatory basin.
Bed-pan washer *or*
Bed-pan disposer.

(*h*) *Cleaning*

(*h*) (i) *Cleaners' room*

(See User Requirement Study No. 10).

Function and activity

(1) Storage of cleaning materials, equipment and cleaning trolley.

(2) Emptying and cleaning of equipment, e.g. vacuum cleaners.

(3) Acting as a base from which domestic staff will work.

Serviced equipment affecting layout

High sink.
Low sink.

(*h*) (ii) *Ward furniture cleaning room*

(See User Requirement Study No. 11.)

Function and activities

(1) Central disinfection and preparation of ward furniture for up to 120 beds both as a routine and after the discharge of a patient.
Dirty side

(2) Stripping bed; linen and plastic covers where necessary; emptying locker.

(3) Holding mattresses, pillows and dirty linen.

(4) Cleaning bed, locker, chair, overtable.

(5) Vacuum cleaning mattress and pillow or wiping down if plastic covered.

(6) Emptying vacuum cleaner.

(7) Washing hands.

(8) Donning and disposal of protective gowns.
Clean side

(9) Holding clean mattresses, pillows, linen and plastic covers.

(10) Making up bed.

(11) Donning and disposing of protective gowns.

Location

Central to the beds served.

Dimensions

The area of 288 sq. ft. is derived from clear dimensions of 13 ft. 8 in. × 11 ft. 8 in. for the dirty side and 11 ft. 8 in. × 10 ft. 8 in. for the clean side.

Serviced equipment affecting layout

Dirty side:
Sink.

(*i*) *Flower bay or area*

Function and activities

(1) Provide trolley space.
(2) Changing water.
(3) Cleaning vases.
(4) Storing vases.
(5) Arranging flowers.
(6) Disposing of large quantities of dead flowers.

Location

This is affected only by the need to dispose of dead flowers, and the possible advantage of having the room accessible to visitors.

Dimensions

The area of 30 sq. ft. implies clear dimensions of 6 ft. 8 in. × 4 ft. 8 in. with a worktop on the long wall.

Serviced equipment affecting layout

Small sink.

(*j*) *Catering*

Function and activities

The function, size, and location of the ward pantry depend on the catering system to be used. This may be:

(*a*) A conventional system in which food is distributed in bulk in heated trolleys from the main kitchen and served by ward staff.

(*b*) The same system as in (*a*) but with service provided by catering staff at ward level.

(*c*) An elaboration of (*b*) in which the majority of foods are distributed in bulk from the main kitchen but certain dishes, which deteriorate with keeping hot, are cooked at ward level. (The ward pantry is then usually called a " finishing kitchen ".)

(*d*) Centralised service of meals on to individual trays in the main kitchen and distribution direct to the bed area in tray trolleys.

Trials of different methods in each of these categories are being carried out but there is at present no definite evidence as to which is most suitable.

Whatever the system it is essential to know, in detail, how it is intended to work. Points for consideration are:

(*a*) Where and by whom are beverages (both with and between meals) to be made.

(*b*) Whether crockery and cutlery are to be washed centrally or for a group of wards and if so, whether this arrangement will cover crockery for beverages as well as for meals.

The function of the ward pantry is to provide a base for the service of meals to patients. It will also be used to make beverages and light snacks (e.g. egg dishes and toast).

The facilities should provide for setting trays, making drinks and snacks, storing ingredients (such as dry provisions, milk and bread) storing crockery, cutlery and service equipment and storing service trolleys.

Where a finishing kitchen system is in use breakfast dishes, grills, fried foods and some boiled vegetables will be cooked in the unit in addition to the other functions mentioned above.

Location

When service is to be carried out by ward staff one pantry is required for each 30-bed ward unit.

When a conventional service is to be provided by catering staff one pantry should be sited to serve two 30-bed units. When a centralised tray service is to be used one small pantry is required for each 30-bed ward unit.

A finishing kitchen should not be provided for less than 90 beds or more than 120 beds.

Where the pantry serves 60 or more beds a fitment for preparing beverages at night will need to be incorporated in or adjacent to the nurses' base(s).

Serviced equipment affecting layout

Type of service Equipment	*Conventional (a) and (b)*	*Finishing (c)*	*Central tray (d)*
Hand basin ..	1	1	1
Double sink with 2 drainers ..	1	1	1
Instant water boiler	1	1	1
Refrigerator ..	1	1	1
Hot closet ..	1	fitted bain marie	–
Boiling table ..	2 rings	2 ovens range	2 rings
Toaster	1	–	1
Grill	–	1	–
Deep fat fryer ..	–	1	–
Dish-washer ..	–	1	–

The areas given in the schedule assume centralised washing up of crockery for main meals except for the finishing kitchen (*c*).

(*k*) *Sister's office*

(See User Requirement Study No. 9.)

Function and activities

(1) Carrying out administrative, managerial and clerical duties.
(2) Interviewing relatives.

These functions would entail talking, reading, writing, telephoning.

Location

In one of the following locations:

(1) near the ward entrance;
(2) opposite a day room;
(3) adjacent to a seminar room;
(4) adjacent to the nurses' station.

Dimensions

The area of 105 sq. ft. is derived from dimensions of 9 ft. 8 in. × 10 ft. 8 in.

(*l*) *Doctor's office*

(See User Requirement Study No. 9.)

Functions and activities

(1) Interviewing.

(2) Carrying out administrative and clerical duties.

(3) Studying.

(4) Talking with colleagues.

The functions would entail reading, writing, telephoning and interviewing.

Location

Convenient to entrance of ward unit.

Dimensions

The area of 105 sq. ft. is derived from dimensions of 9 ft. 8 in. × 10 ft. 8 in.

(*m*) *Seminar and demonstration room*

Function and activities

(1) Formal and informal teaching sessions by medical and nursing staff.

(2) Clinical demonstrations, involving the patient who may be in bed or in a wheelchair, for nurses or post-graduate medical staff.

Location

Sited conveniently to adjacent nursing units. For security reasons there is some advantage in siting it adjacent to a sister's or doctor's office.

Serviced equipment affecting layout

Lavatory basin.

(*n*) *Nursing, lay and domestic administrators' office(s)*

Function and activities

Depending on the administrative operational policies adopted and the size of the ward floor, it may be desirable to decentralise some of the administrative offices. Each floor may then have offices for such staff as floor sister, clinical instructor, housekeeper, lay administrator, domestic administrator.

(*o*) *Staff cloaks*

(See User Requirement Study No. 14.)

Function and activities

(1) Resident male and female nursing, housekeeping and medical staff who may use the ward (say 10 for each 30 beds during the changeover period) will need a common cloakroom to hang up cloaks, change shoes, drain wet umbrellas and store personal items in small lockers, particularly if substantial walking distances from residences are involved.

(2) Non-resident staff (say 5 for each 30 beds), who will have changed their clothes in central accommodation, will need to store handbags, books and other personal items in small lockers. (A maximum of six staff would be expected to use the cloakroom at the same time.)

(3) Separate w.c's. will be required for male and female staff where provided on a floor basis. These may be used by relatives if opening off a public area. Lavatory basins will also be required, one in a lobby adjoining the w.c's. used by each sex, and a hand-rinse basin in each w.c.

Location

Cloakrooms may be centralised on a floor basis or decentralised on a nursing unit basis, depending on considerations of walking distances (particularly for night staff), security and positions of relatives' rooms.

Serviced equipment affecting layout

One w.c. suite and one lavatory basin for each 30 beds.

(*p*) *Patients' relatives' room*

Function and activities

Accommodation of relatives, particularly of more seriously ill patients, allowing them to relax in comfort, take light refreshments and sleep overnight.

Location

This room does not need to be closely related to the ward entrance and can therefore be sited with other relatives' rooms on the same floor, near to lavatory accommodation. There is some advantage in siting it near to the nursing administrator's office, if one is provided, to facilitate access to relatives at night.

Serviced equipment affecting layout

Lavatory basin.

(*q*) *Visitors' waiting area*

(See User Requirement Study No. 8B.)

Function and activities

Patients' relatives and other visitors awaiting access to the patient will wait here. It is desirable that the area be comfortable and reassuring.

Location

Sited to serve one or more wards depending on proximity of ward entrances.

(*r*) *Wheelchair park*

Function and activities

Storage of wheelchairs and patient trolleys if on ward.

Location

Close to ward entrance or to main group of sanitary facilities. The park could be split into two.

(*s*) *Switchgear room*

Function and activities

To house the main isolator and distribution switch-fuse gear for the department. The room should be kept dry and well ventilated and the door should be lockable and open outwards.

Location

Centrally, to reduce the length of circuit wiring where it is practical and economic the switch-room may be combined with the plant room (see " Communications ") but due care should be taken to ensure that the switchgear is mounted clear of all pipes carrying liquids, in case of leakages.

Dimensions

The recommended area is 40 sq. ft. (8 ft. long × 5 ft. deep) to allow a clear passage in front of the switchgear.

CIRCULATION (C)

Corridors should be well-lit and ventilated and normally the clear width of 6 ft. 8 in. is required. However, if adequate provision is made for lay-bys, a clear width of 5 ft. 8 in. will suffice.

COMMUNICATIONS (D)

Plant room

Functions and activities

To house the mechanical ventilation/air-conditioning plant and other central services, e.g. medical gases, heating and hot water calorifiers, pumps and feed and expansion tanks, air compressors, control valves, etc. The construction should be designed to keep the emission of noise and vibration to acceptable limits (see Hospital Design Note No. 4—Noise Control). Natural ventilation of the room should, normally, be satisfactory.

Location

The plant room should, preferably, be located within the periphery of the department and so sited that it does not interfere with the normal working of the department. In a multi-storey building it may not be possible to locate the plant room within the department and provision, therefore, should be made to site it on the roof. Where it can be conveniently and economically arranged (e.g. within the whole hospital complex) the plant room may be shared with other departments.

Dimensions

The area suggested is 300 sq. ft. gross per 60 beds. Adequate access should be allowed for the maintenance of the plant.

VI. Engineering services

39. Engineering services should be designed and installed to ensure ease of maintenance and the minimum interruption of services and disturbance to the working of the department while repairs and maintenance are being carried out.

40. Facilities should be provided for the easy installation of meters should they at any time be required.

41. Ward floors will be designed so that bed areas and most other rooms can be naturally ventilated, and during daylight hours reliance can be placed mainly on natural lighting; mechanical ventilation will be restricted to a few rooms. Exceptional factors such as the depth, height and siting of the building may dictate the need for more extensive mechanical ventilation, or even air-conditioning, and artificial lighting.

42. In placing service outlets user requirements and working arrangements should be carefully considered.

43. The need for adequate fire protection of the building should be taken into consideration in the design of engineering services, especially ventilation schemes. These requirements should be considered during the early stages of design (see the Department's Hospital Design Note No. 2 Protection Against Fire).

Mechanical services

Heating

44. The heating system should be designed for continuous operation and to be available during unseasonable cold periods and nights in bed areas, nurses' stations, day spaces, patients' bathrooms: also in rooms where patients are likely to be undressed.

45. Zoned temperature control of the heating system may be needed to allow for widely varying heat loss conditions. This applies especially where the building has a high proportion of glazing.

46. Space heating requirements should be calculated on the following recommended design temperatures and ventilation rates based on an outside temperature of 30°F. (−1°C).

Accommodation	*Temperature*	*Air changes per hour*
Treatment rooms	70°F (21°C)	6*
Bathrooms	70°F (21°C)	2
Multi-bed rooms, single-bed rooms and day spaces ..	65°F (18°C)	3
Seminar room, clean utility room, sister's room, doctor's room, nurses' station, relatives' room, waiting spaces and lavatories ..	65°F (18°C)	2
Dirty utility/sluice and test room	60°F (16°C)	5
Ward pantry, cloakroom, corridors and staircases ..	60°F (16°C)	2
Linen bays, trolley and chair bays, and flower room or bay	60°F (16°C)	½
Equipment store and cleaners' room	50°F (10°C)	½

*By balanced input and extract mechanical ventilation.

47. A conventional hot water heating system with radiators provides a generally satisfactory form of

heating and has comparatively low installation and maintenance costs, although other forms of heating systems may also be satisfactory.

48. Flush-fitting radiators are to be preferred in that they are easier to keep clean. Convector types, besides being more difficult to keep clean, tend to collect dust and fluff which is a potential source of infection.

49. Radiators should be placed below windows and against exposed walls to counteract cold air currents. Should surface-mounted radiators or convectors be used, sufficient clear space should be left beneath them to facilitate floor cleaning by machines.

50. Where ceiling-heating systems are used they should conform to the recommendations of the Medical Research Council's Environmental Research Unit. These may be found in the *Guide to Current Practice* of the Institution of Heating and Ventilating Engineers.

51. If floor heating is used the floor surface temperature should not exceed 75°F (24°C) and because of this limitation some other form of supplementary heating may be necessary.

52. Where provision is necessary to enable single-bed wards to be at a higher temperature than normal, it may be convenient to provide additional heating by thermostatically controlled low-temperature type electric heaters.

53. A low-temperature electric heater should be provided at the nurses' station. Day spaces may have radiant type electric fires with suitable guards.

54. Electric fires and heaters should be permanently fixed and permanently connected to the electricity supply.

Ventilation

55. Ward floors will normally be naturally ventilated but some mechanical ventilation may be necessary to provide satisfactory conditions in certain circumstances. Factors which will influence the need for mechanical ventilation are deep planning of ward floors, depth of perimeter rooms, height of ward blocks, extraneous noise and air pollution.

56. Where mechanical ventilation is provided three air changes an hour should be adequate for general wards and six air changes in treatment rooms and in wards where a more exacting control of cross-infection is required.

57. It will normally be expected that the core areas of deep-planned ward floors will be mechanically ventilated to an average rate of about eight to ten air changes an hour but it should be appreciated that the number of air changes for individual rooms will vary according to their particular requirements; perimeter rooms will usually be naturally ventilated. Deep-planned perimeter rooms, e.g. six-bedded rooms that cannot be effectively cross-ventilated by natural means, will need to be mechanically ventilated to augment the natural ventilation so as to give a rate of three air changes an hour.

58. In deep-planned wards, floor connecting and peripheral corridors open along their length to naturally ventilated areas will be assumed to be naturally ventilated but corridors separated from naturally ventilated areas by walls and doors should be mechanically ventilated; six air changes an hour should be adequate.

59. For ward floors in high buildings which can be naturally ventilated in suitable weather conditions but in adverse conditions may need to have the windows closed for long periods, mechanical ventilation to provide three air changes an hour in single-bed rooms and six to eight air changes an hour in multi-bed areas is acceptable.

60. Where mechanical ventilation is provided the general air movement should be from clean to dirty areas, where these can be defined, and therefore there should be no re-circulation of air.

61. Where wards are to be mechanically ventilated or air-conditioned the internal design temperature for winter will be as recommended under space heating requirements. The summer design temperature for rooms which are usually occupied is 70°F (21°C), subject to the inside-outside temperature difference during hot spells not exceeding 10°F (−12°C); for rooms which are normally occupied for short periods e.g. ancillary rooms, the design temperature may be taken as midway between 70°F (21°C) and the external design temperature (see paragraph 62 below); the optimum internal relative humidity should normally be taken as 50 per cent. Discomfort may be experienced if the relative humidity is higher than 55 per cent or less than 30 per cent. [With natural ventilation the relative humidity will of course vary widely but, except for exceptionally extreme conditions, will be within the range of 30 per cent to 55 per cent R.H.]

62. The normally accepted external design condition for winter is 30°F (−1°C) 100 per cent R.H. The external design condition for summer varies, in the southern areas, from 82°F (28°C) dry bulb to 66°F (19°C) wet bulb (42 per cent R.H.) to, for northern areas, 75°F (24°C) dry bulb to 63°F (17°C) wet bulb (50 per cent R.H.).

63. Internal rooms should be mechanically ventilated to suit their individual requirements; air inlet grilles are necessary where the ventilation is extract only.

64. Treatment rooms should be provided with balanced mechanical ventilation, the fresh air being filtered and warmed before being introduced into the room at high level through suitable diffusers designed to avoid the creation of draughts and extracted at both high and low level.

65. One or two single-bed rooms per 30-bed nursing unit may need to be mechanically ventilated to enable

these rooms to be used for isolation purposes against infection risks. A ventilation rate of about fifteen air changes per hour should provide a sufficient flow of air through the open doorway to prevent a flow in the opposite direction. Thus a system capable of introducing 15 air changes per hour of fresh air at the end furthest from the door, and extracting at a rate of 30 air changes per hour at the end near the door, would give the required results. Both input and extract ventilation would be used for infectious cases, but where it is important to protect patients against infection the extract would be shut off; background heating from the heating system to offset the fabric losses may be advantageous. Where more stringent control of airborne cross-infection is required air-locks may need to be provided; air-locks, for this purpose, should be pressurised by mechanical input ventilation supplying 15 air changes in an hour.

66. Very exceptionally, in an industrial area, where " smoggy " conditions may be expected, one multi-bed room may need to be mechanically ventilated to minimise the distress of patients with respiratory difficulties. An input system providing only filtered and warmed air equivalent to six air changes an hour should be satisfactory.

67. Internal lavatories should have mechanical extract ventilation to give ten air changes an hour. Mechanical extract to outside should be provided at a high level in the ward pantry and at low level in the dirty utility room and sluice room.

68. Ventilation plants should include filters of 95 per cent efficiency down to 5 microns to give satisfactory filtration of the incoming air supplies and, to save too frequent replacement of these where the air is dirty, it may be desirable to include also coarse filters to remove larger particles.

69. External discharges should be carried clear of the building and protected against back pressure from the wind. Grilles should be installed, preferably in corridor walls, to provide an air inlet for rooms that rely solely on mechanical extract for their ventilation.

70. Visible indication should be provided to show when the ventilation system is operating. The selection of the most suitable position for indicators should be related to the scope of the ventilation system. For individual units, e.g. extract fans, the indicator may be incorporated in the control switch, where a system is peculiar to particular rooms, e.g. treatment rooms, the indicator should be in that room and in the case of more general systems of ventilation, e.g. core areas, the indicator would probably be best located at the nurses' station.

71. Particular care should be given to the type of opening window selected in naturally ventilated wards. Top opening windows at high level should be provided with a " minimum setting " notch or other adjustment to allow air infiltration without draught to the lightly clad patients. In ceiling-heated rooms the incoming air should not be directed at the ceiling.

72. Space heating except for perhaps the top floor, will not normally be required for mechanically ventilated internal rooms but for rooms with external walls background heating to offset the fabric heat losses may be necessary.

Hot and cold water and drinking water services

73. These are normally provided by connection to the main services of the hospital.

74. Hot water storage capacity should be based on meeting the maximum requirement for two hours, and the calorifier battery rating should be based on a three-hour recovery period, having regard also to the heat losses from the mains; an allowance of 10 gallons per bed should provide sufficient storage.

75. The cold water storage should be sufficient for 24 hours requirements; an allowance of 50 gallons per bed should be adequate.

76. Drinking water points will be required, e.g. in the ward pantry and near the medicine cupboard, and should be connected directly to the supply undertaking's mains.

77. Lever-type taps having a mixed flow outlet will be required for staff hand-basins in patient areas and ancillary rooms where aseptic practices make this necessary. Pillar taps should normally be provided elsewhere, but spray mixing taps have advantages for hand-basins *en suite* with w.c's in that water consumption is reduced and the outlet temperature can be controlled.

78. The hot water circulation system should serve bathroom towel rails, heated bed-pan and linen cupboards, and also coils for clothes drying when these are provided.

Sanitising equipment. (See Hospital Design Note No. 4 —Noise Control.)

79. If washing-up is not done centrally a double sink should be provided in the ward pantry, with facilities for hot rinsing; alternatively, where there is likely to be a large amount of washing-up, consideration should be given to the provision of a dish washing machine which rinses at a temperature of 180°/190°F (82°/88°C).

80. If disposable bed-pans are not used a bed-pan washing machine should be provided in sluice rooms. Bed-pans requiring to be sterilized should be obtained from the source of sterile supplies. Where disposable bed-pans are used a bed-pan disposing machine will be needed.

81. The supply of instruments and bowls, etc. will normally be from a central sterile supply department

and therefore there is generally no need to provide sterilizing facilities in the ward.

Town gas

82. Any gas appliances should have a flame-failure safety device. A gas supply may be required in the ward pantry.

Piped oxygen

83. Generally, a piped oxygen system will be provided, with outlets in treatment rooms and in single bedrooms. It can be expected that the wards will be divided into high—and lower—dependency areas. In high dependency areas the normal provision should be one outlet for each two beds. This would normally mean four outlets in a 6-bed ward. A lower provision can be justified in lower-dependency areas; for example, in such areas two outlets per 6-bed ward and one outlet per 4-bed ward should be adequate.

84. In assessing the oxygen supply requirement, a consumption of 25 cubic feet per week per bed for general hospitals and 35 cubic feet per week per bed for teaching hospitals can be used as a rough guide. Generally, a liquid oxygen storage plant will be more economical than cylinders where consumption exceeds 3,500 cubic feet per week.

Piped medical suction

85. Suction outlets from a central clinical suction plant should be provided in wards, generally on the same scale as oxygen outlets; the suction and oxygen outlets should be located together. The installation should comply with the forthcoming British Standard.

Hospital vacuum pipeline services

86. For general ward use a free flow rate of not less than 40 litres per minute when the vacuum system is 500 m.m. Hg. below an atmospheric pressure of 760 m.m. Hg. should be satisfactory.

87. The central plant will normally consist of twin pumps each capable of meeting the design peak demand. Operation of the pumps shall be interconnected so that failure of one will transfer operation to the other. The vacuum distribution pipe lines should be of comparatively large bore to prevent fluctuation of the suction at the outlets.

88. Each suction outlet should incorporate a vacuum restrictor and shut-off valve; vacuum gauges fitted to the suction bottles are to be preferred.

Piped medical gases—plant room

89. The plant room should be carefully sited and precautions taken to prevent noise and vibration being transmitted through the building. The pump exhaust should discharge direct to outside well clear of the roof, opening windows and air intakes. (See Hospital Design Note No. 4—Noise Control.)

Central vacuum cleaning

90. Opinions are divided on the advantages of a piped vacuum service for cleaners' use. This type of system is more expensive to install and run than the more conventional method with individual cleaners. The advantage claimed is that less dust remains after cleaning by the central method but the paper bag attached to individual machines provides quite an efficient filter and the view is held that individual machines offer virtually no hazard with regard to cross-infection. Which is the quieter method is also open to question.

91. Studies are now being undertaken in the use of central vacuum cleaning to see if in fact there are advantages that will justify the additional costs.

92. Meanwhile central vacuum cleaning should not normally be installed.

Pneumatic tube systems

93. The evidence collected from the studies carried out by the Department (see Hospital Technical Memorandum No. 9) points to the conclusion that in National Health Service hospitals comprehensive pneumatic tube systems are of doubtful value. The report indicates that their use is limited, their virtue of speed is over-rated, and they are expensive to install. By comparison, a well-organised messenger service is 50 per cent more effective in eliminating errands, costs virtually nothing to install and operates at about a third of the annual cost.

94. While the value of a comprehensive pneumatic tube system compares unfavourably with an efficient messenger service it is possible that point-to-point communication by tube system may be justified in special circumstances. Separate studies of this possibility are being made by the Department.

Lifts

95. The main lift concentration will usually be closely associated with the wards and will be required to transport patients (ambulant, in wheelchairs or in beds) staff, visitors, food, linen, C.S.S.D. and pharmacy goods, equipment, general stores and waste. It will normally be desirable to install more than one type of lift, each suitable to the class of traffic that it will be required to handle. The lift service for the ward block might include, bed/passenger lifts, passenger lifts, goods lifts and service lifts or hoists.

96. Lift speeds will generally be related to the number of floors to be served and to the type and intensity of the traffic, except, in the case of a fire lift, which should be capable of reaching the top floor from the ground floor within one minute. Speeds up to 300 feet per minute will meet most demands but in tall blocks and where traffic is particularly intense higher speeds may be economic. Lifts should be automatically self-levelling to bring the lift smoothly to a stop within $\pm\frac{1}{4}$ in. of the landing under all conditions of load.

97. Lifts should operate (including car and landing doors) silently and without vibration under all conditions of load. Machinery and control equipment in the motor room should be insulated from the structure to reduce to a minimum, noise and vibration.

98. All lifts should comply with B.S. 2655. Only exceptionally should lifts have more than one entrance.

99. Bed lifts must be large enough to accommodate a hospital bed and attachments, such as drip stands, Balkan beam and medical apparatus, with an attendant. Since bed lifts are also likely to be used for passengers, particularly during visiting times, they should for loading purposes be regarded as passenger lifts. The British Standard 4,000 lb. (27 person) bed lift, speed 100 to 300 feet per minute, platform dimension 5 ft. 4 in. wide by 9 ft. 4 in. deep, inside car dimension 5 ft. 1 in. wide by 8 ft. 9 in. deep, entrance 4 ft. 4 in. wide with a clear height of 7 ft. is recommended. It is also recommended that the controls be mounted on the side of the car and that the car door be of the two-panel side-opening type.

100. Passenger lifts may be necessary to supplement and also to avoid the uneconomic use of bed lifts. Where more than one passenger lift is required it is advantageous to install them in pairs with interconnected control to give optimum service efficiency.

101. The British Standard 15 cwt. goods lift, speed up to 150 feet per minute, inside car dimension 4 ft. 6 in. wide by 5 ft. deep should be adequate for normal purposes; for heavier or more bulky loads a bed lift can be utilised. Depending upon the operational policy separate goods lifts may be required for clean loads and " dirty " loads such as soiled linen and waste.

102. Service lifts or hoists are useful for the unaccompanied carrying of goods.

103. Automatic push-button control of goods and service lifts or hoists should be adequate and also satisfactory for bed lifts and passenger lifts up to four floors. Above four floors dual control of bed lifts and passenger lifts permitting passenger or attendant operation will be required. The case for collective control will depend largely upon the number of floors to be served, the density of traffic, but because of significantly higher capital and maintenance costs should not be selected unless the more efficient lift service is justified.

104. In addition to floor-selector buttons, emergency stop, alarm and door-hold, buttons should be provided in goods lifts and emergency stop and door-hold buttons and a telephone for emergency use, provided in bed and passenger lifts.

105. Landing controls should consist of lift-call buttons, lift-coming indicator and, in the case of collective or supervisory control systems, direction of travel indicators; an audible lift arrival indication may also be required for banks of lifts. Floor-selector buttons with audible or visual warning of lift arrival should be provided at each landing for service lifts.

106. In buildings of more than five storeys there should be at least one lift available for the immediate and exclusive use of firemen by providing at ground level a switch for their exclusive use suitably indicated which will bring the lift to that level and, at the same time, make the landing controls inoperative.

107. Fire lifts should be connected to an essential electric circuit having automatic change-over facilities, and the cables supplying these lifts should pass through areas of negligible fire risk, see Hospital Design Note No. 2, Protection Against Fire and Hospital Technical Memorandum No. 11, Emergency Electrical Services.

Fire alarms and fire-fighting equipment

108. Information on fire alarms and extinguishers is given in Hospital Technical Memorandum No. 16, Hospital Fire Precautions. The advice of the local Chief Fire Officer should be sought concerning the proposed fire-fighting installation.

Incinerators

109. A collecting system and disposal in a central incinerator is to be preferred to a number of local units. Ward incinerators and other local units have the disadvantage that numerous flues will be required which may, in some instances, be too long to be effective; they are often over-charged resulting in incomplete combustion, leaving an objectionable residue to be cleared and impose additional maintenance.

Electrical installation

General

110. The electrical installation in the ward unit will include wiring and equipment for general and special lighting, socket outlets, emergency electric service, bed-head units, telephones, clocks, call systems and also wiring for the mechanical services.

Supply and distribution. (See Hospital Technical Memorandum No. 7.)

111. The electrical supply will normally be provided by a sub-main circuit from the nearest distribution centre. Local switchgear and distribution boards should be sited to minimise the length of circuit wiring. They should be easily reached from a standing position, preferably accessible from corridors, and fitted with locks where necessary. H.R.C. fuses are recommended and adequate provision made for spare ways and fuses.

112. Conduits and cables should be concealed, service ducts being provided wherever practicable. External wiring should comprise either plastic-coated cables in galvanised screwed conduit or M.I.M.S. cables.

Artificial lighting

113. Specialised lighting will be required in wards and treatment rooms; in other areas lighting should follow standard modern practice. Lighting fittings

should have a glare index of not more than 13, should not be dust collecting and should be readily accessible for maintenance and easy to clean.

114. Tungsten lighting is generally suitable for lighting fittings which will be used intermittently. Fluorescent lighting will be economic where lighting is required for long periods. It is, however, essential that fluorescent lighting in clinical areas is one of the recommended types, having suitable colour-rendering characteristics for clinical applications.

115. The following table exclusive of night lighting gives recommended value of illumination for various rooms:

Accommodation	*Average lumens/sq. ft. recommended at working level*
General lighting in multi-bed rooms ..	3*
Minimum in centre of multi-bed rooms	10
Single-bed rooms	10
Bed-head lighting	15
Nurses' station, day spaces, sister's room, doctor's room and seminar room ..	15
Treatment room and laboratory ..	20
Ward pantry, bathrooms, waiting areas, utility rooms, sluice and test room, relatives' room, switch-room and plant room	10
Cleaners' room, lavatories and cloak-rooms	7†
Corridors and staircases, wheelchair bay, flower room, stores and linen bay ..	7†‡

*The standard given is at normal head height at the bed-head.

†The standard given is required at floor level.

‡This may be increased where adjacent intensities are high.

116. Where there is a lack of daylight in internal rooms and corridors of deep plans it will be necessary to provide higher levels of artificial lighting during the day than is normally provided during the hours of darkness. The daylight level of artificial illumination for internal spaces should average 30 lumens/sq. ft. at the working level. In bathrooms, ablutions, w.c's. and cleaners' rooms an average of 15 lumens/sq. ft. at floor level is satisfactory. For evening and night time lighting these values should be reduced to about half. Corridor lighting should provide illumination for day time use of between 20 to 25 lumens/sq. ft. at floor level which can be reduced to 15 lumens/sq. ft. for evening use and for night lighting to between 0·5 to 1·0 lumens/sq. ft. Lighting designed to these standards of illumination should provide not too great a contrast so that staff moving from one area to another can be expected to adapt themselves sufficiently quickly. It is recommended that the lighting system for these spaces should be designed so that the upper and lower levels of illumination can be readily obtained by local switching arrangements to suit day and night use. Where it is necessary to switch off lamps it is preferred that these lamps be in multi-lamp fittings rather than switch off a complete fitting.

117. Exceptionally, for deep planned perimeter rooms permanent supplementary artificial lighting (P.S.A.L.I) may be required. In these instances the lighting should be specially designed to achieve a satisfactory transition from natural to artificial lighting.

118. Local switch control of the lighting is usually satisfactory, but general and night lighting in multi-bedded wards is normally switched from the nurses' duty station. Lighting in corridors, waiting spaces and illuminated signs should be controlled from a central position. The switch positions of staircase lights not centrally controlled should be carefully selected. Local lighting, i.e. adjustable fittings, bed-head lights, etc., should be separately switched.

Lighting in wards

119. During normal evening hours it is recommended that the standard of illumination provided at the bed-head (at normal head height) by the general lighting should be 3 lumens per square foot. The illumination in the centre of the circulation space (usually between the feet of the beds) should be 10 lumens per square foot.

120. The lighting of the nurses' station should be carefully designed for the needs of the nurses but at the same time must not be disturbing to patients, particularly at night.

121. Night lighting should aim at providing an indirect illumination on the bed of 0·01 lumens per square foot and for the rest of the ward just sufficient light to enable staff to move easily around. An illumination at night of 3 lumens per square foot should be adequate for the nurse's desk provided that the nurse does not have frequently to enter ancillary rooms lighted to much higher standards of illumination.

122. The avoidance of glare is important and a glare index of not more than 13 is recommended. All lights should be screened from the beds and no part of a lighting fitting or mirrored reflection visible to any patient in bed should have a luminance of more than 300-foot lambert (200-foot lambert for recessed ceiling-mounted fittings) nor should the luminance on the ceiling or wall from wall-mounted fittings exceed 50-foot lambert for the general lighting, nor 1-foot lambert for the night lighting. These restrictions should be applied also to lighting in corridors, circulation space, etc., outside the ward but visible from the beds through unscreened glazing.

123. Lighting fittings with opaque sides and downward louvres have been found suitable for centre of ward illumination. The lamps should be one of the types having recommended colour-rendering properties for clinical applications. Night lights of low wattage tungsten filament may be incorporated in the centre fittings.

124. Single-bed wards are usually lighted satisfactorily by a single light fitting.

125. It may be desirable in one or two single-bed rooms to have facilities for increasing the general lighting standard if need be to 20 lumens per square foot and, in addition, the provision of a wall- or ceiling-mounted examination light (similar to that in the treatment room) may be considered.

126. Bed-head lights should be provided for each bed position. They should be wall-mounted and may be adjustable, but the movement should be limited to prevent disturbance to other patients. The switch should be either of the simple on/off wall type or be incorporated in the lighting fitting or bed-head unit. These types generally require less maintenance than cord-pull switches but the latter can be operated more conveniently by the patients. The fittings should be of robust construction and designed not to get too hot to touch.

127. Lighting in treatment rooms will vary with medical requirements, but generally there should be a wall- or ceiling-mounted adjustable examination light in addition to the general lighting.

128. For further information on the artificial lighting of wards see SECTION VIII—*References.*

Other lighting

129. Fittings in day rooms should be selected to give a pleasing effect. Corridor lighting fittings should be of the enclosed type and staircase lights should be sited to enable easy cleaning and maintenance. Lighting in ancillary rooms, e.g. ward pantry, sluice rooms, etc., should be arranged to suit the working areas.

130. In compliance with B.S. 2881, a red indicating-light should be provided on the drug cupboard with a parallel indicating-light in the sister's room. These lights should be interlocked with the cupboard to give visual indication when the cupboard is unlocked.

131. Any external lighting fittings should be weather-proof.

Socket outlets

132. Sufficient 13A, universal-type switched, shuttered socket outlets, connected to ring or spur circuits, should be provided to allow each portable appliance which is likely to be used at the same time to be supplied from a separate convenient outlet.

133. Socket outlets in the treatment, nursing and general working areas, at or about skirting height, are often inconvenient and are to be preferred at the working level or at about waist height; outlets wherever possible should be flush-mounted.

134. The following socket outlet distribution is suggested:

Multi-bed wards or bays	Two outlets shared between two beds.
Single-bed wards	One outlet in addition to the one for bed position.

A greater provision of socket outlets may be required in one or two single-bed rooms and possibly in a multi-bed room. For these beds two outlets at the bed in single-bed rooms and two outlets for each bed in the multi-bed room are recommended.

Treatment room	Two twin outlets in addition to provision for fixed electrical apparatus.
Ward pantry	To suit number of appliances, plus one or two for future requirements (depending on the size of rooms). Outlets should include indicating lights.
Seminar and demonstration room	Two twin outlets—one at back, one at front of room.
Doctor's office, sister's room and nursing administration room	One twin outlet.
Nurses' station	One twin outlet.
Day space	One twin outlet.
Relatives' room	Two outlets.
Clean utility rooms	One twin outlet.
Dirty utility rooms	One single outlet.
Plant room	One twin outlet.

135. The placing of socket outlets between bed positions in multi-bed wards is preferred to the arrangement of providing these in the bed-head unit. This will allow the convenient use of both socket outlets at either bed position and also to allow them to be used for other purposes, e.g. domestic machines.

136. Additional socket outlets approximately 30 ft. apart should be provided as necessary throughout the department, including corridors, to allow for the convenient use of domestic cleaning appliances having a flexible lead assumed to be 30 ft. long.

137. Fixed appliances rated up to 13A. should be permanently connected to 13A. fused spur boxes. Appliances rated in excess of 13A. should be permanently connected to separate final sub-circuits and independently switched.

138. Indicating lights to show when the electrical supply is switched on should normally be incorporated in electro-medical apparatus or low temperature heating appliances, see Hospital Technical Memorandum No. 8, Safety Code for Electro-Medical Apparatus. Where this is not provided, a red or alternatively a plain neon-lamp behind a clear lens, may be required in the plug-top.

Emergency electric supplies

139. Guidance on the provision of emergency electric supplies is given in Hospital Technical Memorandum No. 11, Emergency Electrical Services.

140. Emergency lighting grade (*b*) to about half the normal recommended standard to enable essential activities to be carried on should be provided at the nurses' station and in the general working areas of treatment and utility rooms.

141. In wards where emergency socket outlets are provided, portable lighting fittings should be available or alternatively battery-operated lanterns provided.

142. Skeleton emergency lighting grade (*c*) to a much reduced standard but sufficient to allow free movement may be required in other nursing areas not included above and should be provided in corridors, staircases and waiting spaces to allow movement with reasonable safety.

143. Battery-operated lanterns should be provided for working areas which have no installed emergency lighting.

144. Emergency socket outlets should be so distributed that in each area where essential equipment will be used socket outlets connected to at least two separate sub-circuits are available. Assuming that beds can be re-positioned to suit the socket outlet, two socket outlets connected to essential circuits should be provided in wards of one to four beds and *pro rata* where the number of beds exceed four.

Mains voltage outlets for mobile X-ray apparatus

145. X-ray apparatus calls for heavy current for only a very short period and for satisfactory operation it is necessary that the sub-circuit be capable of carrying these heavy currents without undue voltage drop or over-heating.

146. 13A. socket outlets and ring circuits are suitable for supplying all mobile X-ray apparatus. A special 13A. plug is available commercially which has been designed to accommodate the larger sizes of flexible cables used with mobile X-ray apparatus. It is important, however, that the impedance of the mains up to the 13A. socket does not exceed the limit specified by the set manufacturer, otherwise excess voltage drop may occur during exposures.

Typical maximum mains impedance requirements are as follows:

300 m.A. sets	..	0·34 ohms
200 m.A. sets	..	0·6 ohms
100 m.A. sets	..	1·0 ohms

147. Tests have shown that standard distribution arrangements and 7/·029 in. ring circuits will enable impedance readings of less than 0·34 ohms to be obtained in some instances, but values may be in excess of 0·34 ohms where long sub-main or ring wiring is involved. With 240V. mains and an impedance of 0·1 ohms at the distribution fuse-board, all 13A. sockets will have an impedance less than 0·34 ohms where 7/·029 in. wiring is used and the length of the ring does not exceed 85 yards or 130 yards where 7/·036 in. wiring is used.

Staff location system

148. A radio carrier system should be provided as part of the general staff location system of the hospital. See Hospital Technical Memorandum No. 20, Staff Location Systems.

Patient/nurse call system. (See Hospital Technical Memorandum No. 15.)

149. A non-auditory (speech) patient/nurse call system should be satisfactory for most ward units; the ward layout may, however, have some influence on call-button requirements and the location of call-indicators.

150. Normally, call-buttons will be required at each bed position, in day spaces, treatment rooms, patients' bathrooms, ablutions and w.c's. A reassurance light should indicate to the patient that the call has been made.

151. An immediate visual or audible indication that a call has been made should be provided at the nurses' station and at other parts of the ward unit where nursing staff may be present and should give responding staff an unambiguous identification of the source of the call.

152. An emergency button should be provided at each bed-head so that a nurse attending and unable to leave a patient can summon assistance.

153. In wards the patient call facilities will usually be incorporated in the bed-head unit. For other call points flush-mounted call-buttons with reassurance light should be provided except in treatment rooms where a pear-push may be more suitable.

154. Provided that a cancellation-button is sited within view of patients originating the calls it can be arranged to cancel a number of call points. Separate facilities should be provided to cancel emergency calls originated by staff.

Radio and television. (See forthcoming Hospital Technical Memorandum.)

155. Radio and other sound facilities providing a choice of five channels should be relayed from central equipment to all bed-head units. Radio in day rooms should be from loudspeakers, incorporating a programme selector, on/off switch and a volume control, connected to the central system.

156. Television aerial sockets connected to a communal aerial by the amplifier set should be provided in all day rooms or in a special television room for a group of wards rather than in bed areas. Television aerial sockets may also be required in wards used for long-stay patients who are unable to leave their beds or rooms. In these instances the sound should be conducted through bedside head sets to earphones, to avoid disturbing patients who do not wish to listen. Where television sets are installed in day rooms it may be desirable to provide facilities for the sound to be conducted by earphones to ambulant patients in order to stop any spread of noise to nearby bed areas.

Patients' bed-head unit

157. A flush-mounted bed-head unit is usually provided at each bed position and should include an outlet for a nurse-call push-button reassurance light, cancellation-button and the emergency nurse-call button.

The pear-push socket should differ from any other type of socket.

158. A multi-channel outlet should also be provided so that a hand unit, or other facility convenient to the patient, incorporating the radio, television, etc., sound, selector and off-switch and volume control, the patient-call button, reassurance light and the bed-head light switch can be plugged into the bed-head unit.

Telephones. (See forthcoming Hospital Technical Memorandum)

159. Telephone facilities for internal and external calls for the ward unit will form part of the hospital telephone system, and will normally be provided in the doctor's room, sister's room, and nurses' station. Telephones should normally be desk pattern, and for sisters and nurses they should be fitted with an indicating call light visible from the corridor, and a bell of subdued tone which, when desired, may be switched out of circuit independent of the call light.

160. G.P.O. telephone socket outlets for use with a portable call box unit may be provided on the following scale:

One socket outlet for 8 to 12 patients in multi-bed wards—with a minimum of one socket outlet per ward.

One socket outlet in each single-bed room.

One in patients' day space and one in the room for relatives of dangerously ill patients.

Special telephone jacks are available for this purpose. Outlet boxes to suit this jack will be required in the telephone conduit or duct system.

Electric clocks

161. Electric clocks will normally be required at the nurses' station, day space and treatment rooms. Clocks should have silent movements and in treatment rooms should have a sweep second-hand; 9-inch diameter dials should be adequate for most situations.

VII. Terminology

Multi-ward floor

A floor on which a number of ward units are grouped to allow flexibility in size of the individual ward unit and greater efficiency of use of beds.

Peripheral banding

The planning of the majority of bed areas on a ward floor in a continuous band along the periphery of the building.

Interchange beds

Beds adjacent to the nominal boundary between two ward units. These beds can be used by either ward unit as the need arises, thus increasing the size of one ward unit at the expense of another.

Patient dependency

The extent of the needs of a patient in terms of nursing care. (See below.)

Intensive therapy

Patients requiring constant medical and nursing care who are in a critical stage of illness and who may require much mechanical equipment.

Intermediate care

The majority of patients in any hospital: if within a ward these may be divided into groups:

Group A: Heavy nursing (*i.e. high dependency group*). Those patients who are bedfast or semi-bedfast requiring basic and technical nursing skills.

Group B: Other intermediate. Those patients who still require routine nursing care but who are not seriously ill.

Group C: Self-care. Patients aged 12-75 years of age, up at least 4 hours in total during the day, ambulatory, able to feed, wash and go to the toilet by themselves.

Progressive patient care. The systematic grouping of patients according to the degree of illness and dependence on the nurse.

Operational policy

Inter-departmental:

A description of the hospital in action, to show the inter-related activities of every department within the hospital and all points at which these activities involve outside agents, units, or departments, i.e. transport, communications, supplies, services.

Intra-departmental

A detailed description of all activities taking place within a given department. This involves patients, staff of all grades, services, supplies, transport, etc.—with special emphasis on the needs of the department concerned.

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